AMRAD NEWSLETTER

Amateur Radio Research and Development Corporation June 1983

AMRAD Meetings

June 6 Meeting:

Spread Spectrum Review by Hal Feinstein.

July 18 Meeting:

To be announced.

August 1 Meeting:

Direction Finding Techniques by Bob Bruninga

Hamfests Coming Up

The Ole Virginia Hams A.R.C. will hold the Manassas hamfest on Sunday, June 5 at the Prince William County Fairgrounds. Talk-in on the 146.37/146.97 repeater or 146.52 simplex.

The Frederick Amateur Radio Club is holding a hamfest on Sunday, June 19 at the Frederick Fair Grounds. Talk-in will be K3ERM on 146.52 MHz.

Long Island Computer Faire

The Long Island Computer Association (LICA) is holding their Computer Faire Saturday, June 4 in Plainview, NY. It is being held at 115 East Bethpage Rd., and admission is $2.00. For further information, call 516-333-4213 or 516-293-8368.

AFCEA Show

The Armed Forces Communications Electronics Assoc. (AFCEA) is holding their annual show at the Sheraton Washington Hotel on June 14, 15, and 16. There is an Amateur Radio Operators Luncheon on Wednesday at 11:30 a.m. The cost is $16.00, and tickets MUST be purchased ahead of time. For more information please call 703-425-8525.

Metrovision Meeting

Metrovision will be holding their next meeting on June 7, 1983. It will be in two parts, with the first part being held at the National Captioning Institute, Suite 1500 5203 Leesburg Pike, Falls Church, VA at 6:15 p.m. This will be a demonstration on the closed-captioning done live over ABC's evening news at 6:30 p.m. The business part of the meeting will follow at the Rotunda Room, Seminary Towers West (4801 N. Kenmore St.) in Alexandria at 7:30 p.m.

ARRL Openings

The American Radio Relay League has two full-time positions in the Technical Department at Hq. Applicants must have experience as a radio amateur, hold a current Amateur Radio license, possess a solid technical background and have writing and editing skills. Recent design experience is desired in one of the following areas: (1) rf/analog circuitry, (2) digital circuitry, and (3) software development including assembly and machine levels. These are entry-level positions with opportunity for advancement. Salary is dependent upon academic background and experience. Contact Paul Rinaldo, W4RI, Manager, Technical Dept., ARRL Hq., 225 Main Street, Newington, CT 06111. Telephone 203-666-1541.

Dayton Hamvention

Well, Dayton is over for another year! For those of you who didn't make it this year, it was great! Well, almost great. Everything wen't smoothly until it rained. And rained. And drenched. My tennis shoes are still soaked! The rain may have dampened the spirit of those in the flea-market (who wants to buy wet fleas), but the commercial exhibitors must of been happy. I spent all of Friday and about half of Saturday at the packet radio booth, and it was mobbed almost the whole time! I hope this means there is more interest in packet radio. The TAPR boards were working well, running a bulletin-board system over two-meter packet.

The most often asked question I heard was: "What is Packet Radio?" This was followed by a quick discussion of RTTY, AMTOR, and then packet. Many hams left with a good basic understanding of what packet radio has to offer.

While at Dayton, I picked up some Shuggart SA-800 type disk drives, which are going to be used to upgrade the AMRAD CBBS system. I have located a controller board, so the CBBS should be running on the eight-inch drives before long.

Articles Needed

The AMRAD Newsletter is looking for articles of a technical nature on almost any subject. If you have built an Amateur Radio and/or computer related device, or written software that you think others would benefit from, please write it up and send it in. Send it to the AMRAD address attention Newsletter Editor. If your article is in word-processor form, call Terry before sending it in, as an easier way (such as modems) may be used to get it in.

Address Correction Again

Our address has changed again. This time it was due to some internal problems at the post office. The correct address for AMRAD correspondence is the following:

Amateur Radio Research and Development Corp.
PO Drawer 6148
McLean, VA 22106

SPREAD SPECTRUM

Hal Feinstein, WB3KDU
1410 Rhodes St. North
Arlington, VA 22209
703-524-9116 home

Spread spectrum techniques are new to the majority of civilian radio users, and what's more, they are very much different from what most communications people have come to accept as "radio". Therefore, it's not surprising to find hardened opinions on both sides. You can easily get tied up in the battle of opinions without a valid perspective.

There is in the civilian sector a very large investment in terms of economics, training, skills, and in-place operational systems in conventional communications techniques. Spread spectrum represents a new and possibly useful technology which can quite possibly dent the existing marketplace of conventional systems.

As communications people we are only interested in the technical merits of a technology: can it be built economically? does it interfere? is it more efficient for a given power? However, sometimes gaining a wider perspective can be useful.

To this end, anyone interested in spread spectrum should read up on the battles Wideband FM went through. We accept this technology today as commonplace in broadcasting, television audio, two-way mobile, and military communications but this was not always the case. Armstrong, the inventor of many radio techniques common today (hetrodyne and superhetrodyne receivers, the common detector, regeneration and superregeneration receivers among them) spent most of his time in court. First there was a concerted effort to block FM from the marketplace. Then, when some people realized the marketplace wanted it, Armstrong had to fight patent infringment cases.

The history of early communications is very much tied in with Amateur Radio. The first transatlantic transmission on short wave was done under the sponsorship of the American Radio Relay League and with the assistance and cooperation of Armstrong, who at the time was among the few that knew anything about amplifying weak signals. Armstrong did more than review a few ham radio articles, he helped design and build the station used on this side of the Atlantic. Armstrong was NOT a licensed Amateur.

The Amateur Radio Service has been a place where over the years many new techniques and the energetic people who invented them have taken refuge when the commercial world could see no use for their invention. The Amateur Radio Service has served as a place where these inventions could be experimented with and developed until the commercial sector became interested.

This story is one that every Amateur Radio operator should know. This reason for having Amateur Radio seems all too often to have been missed by us in favor public service arguments. This is a service of invention and development free of the strict rules and financial liabilities of the commercial sector. A readable book on the subject of Armstrong and FM is "Man of High Fidelity" by Lessing. Unfortunately, this book is out of print, but it might be available at your local library.

New Spread Spectrum Company

I have talked recently with the owners of Transcrypt International, a small company of talented people in Nebraska. They are marketing a frequency-hopping radio which employs microprocessor techniques and hops over a 10 MHz range in the 140 to 170 MHz band using NBFM. The dwell time of the rig is currently set to be about 80 to 100 ms. Transcrypt can modify this to meet most specifications for shorter dwell times. The unit is aimed at the export market and several orders have been filled so far. The cost of the unit is around $2,000 each and it is suitable for mobile, portable, or base operation.

Transcrypt Int. has a number of interesting spread spectrum product ideas on the drawing board. The offering described here is a frequency-hopper, but they tell me that they have designed a few direct-sequence types as well. We arranged to meet with the Transcrypt folks when they were in Washington on business, but we couldn't make the hook up. Another meeting is being worked on and we'll give you more information about these rigs as we get it.

Spectral Filtering for Direct-Sequence

An interesting technique has come to light recently which enables the spread spectrum user to specify the shape of the spectrum of a direct-sequence spread spectrum signal that he is transmitting. The way that the spectrum is shaped is by manipulating the code sequence which is used to spread the signal. Manipulation of the code sequence is by means of a logic circuit which has special properties and can be thought of as a "logical filter".

The spectrum is shaped by the fact that the transmitted spectrum is a combination of the transmitted pulse shape, the spreading code speed, and the statistical properties of that code. It is the statistical properties of the spreading code that are being changed by the logical filter. Remember that the statistical properties of the code are originally pseudorandom and looks like noise. The spectrum of such a code seems like noise with some energy at every frequency. By logical filtering we have changed the spectrum so that different amounts of energy will be present at various frequencies. When this is used to spread the rf signal, the spread spectrum signal will mimic the energy distribution designed into the spread code by logical filtering.

By using spectral shaping (or spectral editing) we can move energy out of any portions of the spectrum that have conventional station activity or need low noise protection for other reasons. This may help with the problem of the near/far effect by holding down energy in areas of the spectrum where nearby conventional stations might experience interference.

THE DEAF AND THE TTY

Barry Strassler, KA3KDF
Executive Director
Telecommunications for the Deaf, Inc.
814 Thayer Avenue
Silver Spring, MD 20910
301-589-3006 (Voice/TTY)

Feedback From a Deaf Ham

I wish to share with you a letter from a deaf ham. His insight and perspective is something for you to chew on. Here it is:

Dear Barry,

I received the AMRAD Newsletter the other day, and I was delighted to learn that you are now KA3KDF! Please allow me to welcome you to the wonderful world of Amateur Radio. It has been a big part of my life for 15 years now, and I hope you will find it as enjoyable for many more years!

Are you on the air yet? I would be happy to talk with you. I am able to get on 80, 40, 15, or 10 meter CW ... Let me know , with some suggested dates/times/frequencies.

Your article in the AMRAD Newsletter is very good and very thought provoking. I would like to respond to some of your points very briefly, with the hope we can discuss them further later on.

First, you are absolutely right--there are a lot more hearing impaired hams out there. I suspect that you will find either or both of two things: (1) that most of them are deafened, as opposed to deaf or hard-of-hearing; and (2) that very few identify themselves as members of the Deaf Community (not, for example, in the same way that you and I identify ourselves). I wonder if the Courage Center mentioned Gail, WA1OPN, who is a deaf-blind ham in Worchester, MA; if not, there is an article in (I think) October 1982 QST under "YL News and Views" that I found very interesting. I am active on the Eastern Massachussetts-Rhode Island CW traffic net at 7:00 and 10:00 p.m. on 3658 kHz.

You asked rhetorically about setting up a formal organization serving the needs of the identified deaf amateurs. That is a good question, and I think that it depends on the perceived needs of the people you are able to identify. Once you have that information, your other questions will be easier to answer.

But there are ways we can begin working on some of these issues, Barry. One of the things you brought up was training deaf people to solve technical problems such as tactile devices and corrective audio devices. You might want to look at whatever materials Courage Center may have relative to this. I have never seen any of their materials, but I have heard they cover a lot of bases. The ARRL has an information sheet for disabled amateurs, which I saw once. I think it has little if anything about deafness. So that might be a place to begin, by working with the ARRL to develop an expanded version of their existing materials, or to develop a seperate information packet. Another way might be to sign on with the ARRL as a Technical Assistant (TA). Normally what happens is that the ARRL gets a request for technical assistance, and routes it to its technical department. If the problem falls within the staff's area of expertise, they respond; otherwise, they refer to the TAs, who are volunteer amateurs with special areas of interest. Sometimes, they attempt to locate a TA who lives in or near the requesting amateur's community, so as to allow direct contact.

Whatever format, organizational objectives, and philosophy the group takes (if it gets off the ground), I would be all in favor of its becoming involved in training. And, I hope that you have thought also of using this organization to spread Deaf Awareness as well! Some deaf hams may not be members of the Deaf Community, but could find that they enjoy associations with other deaf hams and with other deaf people as well.

Hmm...about the Morse code requirement...I am very, very biased in favor of retaining it. As you may know, the FCC has released a Notice of Proposed Rule Making (NPRM) asking for comments on the idea of establishing a codeless license. The idea is that either they would give the Technician exam withou the code test; those hams would have privileges above 50 MHz, or they would establish a new class of license called Experimenter with an examination focusing on digital and other advanced amateur technologies. Hams with this license would have privileges above 144 MHz. (I got this information from an ARRL bulletin from W1AW; full details in March QST.) The league is very opposed to the idea for a number of reasons, some of which are explained by ARRL President Vic Clark, W4KFC, in an editorial in QST. My opposition has nothing to do with deafness. I don't think the code requirement should be relaxed for anyone, hearing or deaf.

H-O-W-E-V-E-R, I did, and still do, have some quarrel with the FCC about the way the code exam is sometimes given in their offices. In the old Washington office (now closed), they used headphones. I couldn't hear anything with them, and had to make special arrangements to take my test in a back room with a speaker hooked up to the Instructograph. When I took my extra, they had switched to cassette tape recorders, but the characters were not audible from a distance. I had to persuade the Engineer-In-Charge to let me sit next to the recorder and to allow me to adjust the volume and pitch controls so I could hear the characters. Well, after I passed the exam and got my license, I called the district office and asked for the Extra Class certificate they issue upon request. I explained that I was deaf and was calling through an interpreter, and could I please have a certificate? The Engineer I spoke with actually said that if I was deaf, I shoudn't have a license in the first place. I was shocked, to say the least, seeing how I had already had a license for 12 or 13 years by that time! I dropped a note to Bill grenfell, W4GF, telling him of this, and he was shocked also. I finally got my certificate, but it was not without encountering the insensitivity of some FCC personnel.

But perhaps help is on the way. Hopefully within a year or so, the burden of conducting amateur exams will be transferred to radio amateurs themselves, as a result of last year's Goldwater legislation. That means we may see more flexibility in the examination process, at least in the administration of the code exam. It will be important, when the FCC and/or the ARRL asks for input from the community, to make our feelings known on whatever accommodations may be needed for deaf hams in taking the code examination.

I hope this information is helpful to you, and I really would like to hear from you and learn what your thought are on these issues. Again, welcome to amateur radio, and please let me know if you would like to have a QSO!

Bob Weinstock, KN1K
62 Atherton Rd.
Brookline, MA. 02146

(ed note: Due to space limitations some of Bobs letter was not reproduced. Most of the pertinent comments were squeezed in however.)

Tucson Amateur Packet Radio Activities

Lyle Johnson, WA7GXD
P.O. Box 22888
Tucson, AZ 85734

The Dayton Hamvention was an unqualified success. The Packet Forum, arranged by Bob Neben, K9BL, TAPR's Dayton Beta Coordinator, was held on Friday afternoon at 4 PM. Paul Rinaldo, W4RI, led off with a history of Amateur packet activity, followed by Peter Eaton, WB9FLW, (SLAPR President and TAPR St. Louis Beta Coordinator) who spoke on the St. Louis packet network and packet applications.

I followed with a rundown on the basic functions of a TNC and Bob Neben concluded with a look at applications of packet in the emergency communications area. This was all followed by a demonstration.

As near as I was able to ascertain, we had the largest room and held the largest crowd the longest of any presentation at Dayton! Obviously, packet radio is a very timely subject of great interest in the Amateur world.

Together AMRAD, SLAPR, TAPR and the Miami Valley FM Association (a Dayton based group) manned a booth catalogued Amateur Packet Radio for the entire convention. Thanks go to Pete and the SLAPR gang for putting together an attention-getting setup. There was a video tape going, as well as a bulletin-board system, TNCs and literature. We all garnered memberships, with TAPR now at 313 and climbing!

The most-often asked question, as always, was, "How can I get a TAPR TNC?" The answer invariably brought disappointment, since they aren't in general distribution yet.

The next question was usually, " When will I be able to get one?" Surprisingly enough, the answer is very, very soon! As a matter of fact, TAPR will be holding a design review of the TNC hardware on 10 May (this is written on 7 May) and will finalize the TNC design changes not later than the 15th. We have been told that the layout update will be in our hands not later than the 15th of June, at which point the PC house will make about 30 boards. These boards will be sent out with complete parts kits about two weeks later (PC turnaround time) to a carefully screened group of participants in various Beta sites. Assuming that all goes well, it should only be a matter of about two weeks from then that the kits will be made available on a first-come first-served basis, with priority given to those TAPR members who don't have a TNC.

Please understand that these are all soft deadlines (I have been repeatedly warned about mentioning dates) and subject to change (later, not sooner) as the volunteers get weary...

The prices are yet to be determined, but is about 99% sure to be above $200 and below $300 for the board, manual, all parts, connectors, cables and what-have-you -- but excluding case, power cord, fuseholder and fuse.

If you are interested, please send an SASE to TAPR for details. The kits will require an advance deposit at first.

The St. Louis gang has designed a very impressive case for the TNC, and this was shown at Dayton. It consists of a black-anodized aluminum frame with removable top and bottom covers. Labelled holes are punched for the various LEDs and power switch on the front. The rear panel contains cutouts for the serial and parallel port connectors (DB-25 style), fuse-holder, power cord, and phono jacks for mic audio, speaker sudio, ptt and a spare. They have about 50 orders in, and when they get 100 they'll turn the crank and ship the cases. If you have a TNC, or plan to get one, this cabinet is highly recommended.

The EPROM programming accessory for the TNC is progressing nicely, with the first PC boards expected around the 15th of May. The software will be written and the boards tested. The kits will then be sent to those that ordered them in the Beta sites. Naturally, these kits will also be available when the TNC kits are released. The EPROM programmer will be set to accomodate the 2764 and 27128 EPROMs, with 27256 support planned. Intel has developed a so-called "intelligent algorithm" that enables a 2764 to be programmed in about 2 minutes, and a 27128 in 3 1/2! This compares to a normal programming time of almost 7 minutes and 14 minutes respectively!

Kudos to Mel, KOPFX of SLAPR for the artwork and design modifications to allow this. Actually, Mel took his liberties with the rather spartan design I gave him, and the result is a very versatile unit. Margaret, KV7D, who is writing the software, has plans to make it a general purpose EPROM programming device, allowing the TNC to accept S-records, or possibly Intel formatted object code, from a host, downlaod into TNC RAM, and then burn the EPROM. No promises, however. The unit will allow duplication of the on-board EPROMs, which is its primary function. Note that the software is universal in the sense that there are no assembly-time options needed to specify serial port parameters, call signs, etc., as these are stored for the operator in non-volatile memory. This eases distribution tremendously!

In addition to supporting the above activities, TAPR is committed to the high-speed terrestrial linking system that must be developed to make packet radio a dominant communications mode. Initial design work is progressing on that front. This is still at the straw-man stage, so if you have any ideas here, please send them to TAPR today! Various individuals are starting to volunteer for designing the necessary subsystems for this, and your help is solicited.

Some of TAPR's members have written articles for the various Amateur magazines, and many of these will be appearing in the summer and fall. Keep your subscriptions current, there is going to be a lot of information on packet radio appearing in print this year!

As you read this, Phase 3 should be poised for launch. Here's hoping the ESA and ARIANE successfully aid in changing Phase 3-B to AMSAT/OSCAR 10! The satellite linking experiments should prove very interesting. See you on Mode-B!

PROTOCOL

David W. Borden, K8MMO
Rte 2, Box 233B
Sterling, VA 22170
703-450-5284

Hank 5.1 Arrives

Hank Magnuski, KA6M, has done yet another cut at the famous LIPM and TIPM VADCG TNC software for AX.25. Hank prefers to call it something else, but it is still the new national packet HDLC standard for link level protocol. I had previously distributed his 5.0 code, but the new version fixes some bugs in 5.0. I have tested the code with TAPR boards and it appears to work well. I shipped part of a large file to W3VS, Scott, running the latest TAPR software and received a large file from him with no errors or hangups. I have worked Scott both direct and thru the AMRAD simplex-on-duplex repeater, WB4JFI/R. Hank appears to have done well again. There appear to be two constraints:

1. The asynchronous side (Terminal) of the board should not be run faster than 4800 baud or characters are missed due to the interrupt processing on a character by character basis. Handshaking must be employed if a computer is supplying the characters at full speed (RTS and CTS). Nothing is certain in monitor mode and overrun can easily occur, but connected everything appears good.

2. The correct use of the P/F bit and correct methods for recovering from timeouts and receiver not ready conditions have still to be established by the protocol persons. Study will be made of the TAPR code and the Hank code to observe differences.

TAPR Upgrade

Through the efforts of Phil Karn, KA9Q, new TAPR code has been received. Contact Rich, K1HTV if you want the complicated details of how the local Washington TAPR gang got the latest code, but they have it and it works swell.

Vancouver Upgrade

Jon Bloom, KE3Z, has been working on new AX.25 8080 assembly language code for Terry Fox's PAD board and the Vancouver board. He wants this code to be pluggable, that is, operate on any Z80/8080/8085 computer with HDLC chip installed. We all wish Jon the best of luck. So far we have seen a successful repeater using the drivers of this code. He has actually finished a cut at the TNC style code, but is not happy with the performance of it and has returned to the coding board (like the drawing board, but bigger).

Metro Area Packet Radio
Status as of May 22, 1983

Vancouver TNC Users:	
K8MMO,Dave	Active most nights-some host computer time provided
KE3Z,Jon	Active sporadically
W4CQI,Cliff	Active nightly with TAPR now
WB4JFI,Terry	Simplex-on-Duplex packet repeater-147.81/147.21
WB5MMB,Sandy	Simplex repeater 147.585
W3IWI,Tom	Active sporadically with TAPR board now
W4MIB,Bill	Inactive-First AMRAD Packeteer
WB4MAE,John	Inactive
WD5DBC,Howard	Almost ready to go
K3HOI,John	Almost ready to go
WB4WQZ,Chuck	Almost ready to go
WB4NFB,Bill	Almost ready to go
TAPR TNC:	
W3IWI,Tom	Active sporadically Beta Test Coordinator
K1HTV,Rich and KA1GD,Andy	Active daily-some host computer time provided
W4PUJ,Dick	Active sporadically
W3OTC,Bob	Active sporadically
W3VS,Scott	Active daily
W4CQI,Cliff	Active daily
Other Hardware:	
KE3Z,Jon	STD Bus Computer with SIO HDLC chip for packeteering

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AMRAD — Amateur Radio Research and Development Corporation

Membership Application/Renewal

Mail to: Dr. William P. Pala, WB4NFB
5829 Parakeet Drive
Burke, VA 22015

See reverse for overseas mailing rates.

	Annual
Dues: Regular	$15
2nd in family same adr	8
Full-time student	5

Please make checks payable to AMRAD.

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I agree to support the purposes of the Corporation.

Class License_____ ☐ARRL Member
Interests:
☐Packet Radio ☐Spread Spectrum
☐RTTY ☐Deaf TTY
Computer model_____
Microprocessor type_____

*Signature*_____

The Amateur Radio Research and Development Corporation (AMRAD) is a worldwide club of over 500 amateur radio and computer experimenters. It is incorporated in Virginia and is recognized by the U.S. Internal Revenue Service as a tax-exempt scientific and educational organization.

The purposes of AMRAD are to: develop skills and knowledge in radio and electronic technology; advocate design of experimental equipment and techniques; promote basic and applied research; organize technical forums and symposiums; collect and disseminate technical information; and, provide experimental repeaters.

Meetings are on the 1st Monday of each month at 7:30 P.M. at the Patrick Henry Branch Library, 101 Maple Ave E, Vienna, VA. If the first month is a holiday, an alternate date will be announced in the newsletter. Except for the annual meeting in December, meetings are normally reserved for technical talks - not business.

WD4IWG/R is an open repeater for fm voice and digital communications, especially for experimental modes. It is located at Tyson's Corner, McLean, VA. It features semi-private autopatch available to licensed members. Frequencies are: 147.81 MHz in, 147.21 MHz out. The repeater director is Jeff Brennan, WB4WLW.

WB4JFI/R is a 1200-baud half-duplex packet repeater in Falls Church, VA and may be accessed via WD4IWG/R frequencies.

WB5MMB/R is a 1200-baud simplex packet repeater on 147.585 MHz from Vienna, VA, soon to become K3NA/R from Frederick, MD.

The AMRAD CBBS, 703-734-1387, is operated by Terry Fox, WB4JFI. The system accepts 110, 300, 450 and 600-baud ASCII, Bell 103.

Handicapped Education Exchange, 301-593-7033, is operated by Dick Barth, W3HWN. HEX accepts 110/300-baud ASCII and Baudot deaf TTY/TDD calls.

AMRAD is affiliated with the American Radio Relay League (ARRL), Foundation for Amateur Radio (FAR), Northern Virginia Radio Council (NOVARC) and the Mid Atlantic Repeater Council (T-MARC).

The AMRAD Newsletter is mailed monthly to members and other clubs on an exchange basis. Technical articles, product announcements, news items, and other copy relating to amateur radio and computing are welcome. Honorariums at a rate of $0.10 per 50-character printed line ($20 maximum per author per issue) are paid for original material accepted. Classified ads are free to members. Commercial ad inquiries are invited. The editor reserves the right to reject or edit any portions of the copy. Items should be mailed by the 8th of the preceeding month to Editor, AMRAD Newsletter, P.O. Drawer 6148, McLean, VA 22106. Full permission for reprinting or quoting items is granted provided that credit is given to both the author and the newsletter. Mailing to U.S. and possessions is by 3rd Class bulk mail. Canadian and Mexican addresses add US$2 for postage. Overseas readers add US$8 for air mail or US$2.30 for surface.

AMRAD officers for 1983 are:

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Amateur Radio Research and
Development Corporation
P.O. Drawer 6148
McLean, VA USA 22106

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1/84 M
HANK S. MAGNUSKI KA6M
311 STANFORD AVE
MENLO PARK CA 94025